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The United States of America

The Commissioner of Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person or persons having title to this patent the right to exclude others from making, using or selling the invention throughout the United States of America for the term of seventeen years from the date of this patent, subject to the payment of maintenance fees as provided by law.

Bruce Lehman

Commissioner of Patents and Trademarks

Sandra J. Morton

Attest

NOTICE

If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon

United States Patent [19]

Powell et al.

[54] **EXTENDING COMPUTER ARCHITECTURE FROM 32-BITS TO 64-BITS BY USING THE MOST SIGNIFICANT BIT OF THE STACK POINTER REGISTER TO INDICATE WORD SIZE**

[75] Inventors: **Michael Powell**, Palo Alto; **Robert Cmelik**, Sunnyvale; **Shing Kong**, Mountain View; **David Ditzel**, Los Altos Hills; **Edmund Kelly**, San Jose, all of Calif.

[73] Assignee: **Sun Microsystems, Inc.**, Mountain View, Calif.

[21] Appl. No.: **321,459**

[22] Filed: **Oct. 11, 1994**

Related U.S. Application Data

[63] Continuation of Ser. No. 146,433, Oct. 29, 1993, which is a continuation of Ser. No. 632,017, Dec. 21, 1990.

[51] **Int. Cl.**[6] **G06F 12/04**

[52] **U.S. Cl.** **395/500**; 395/800; 364/DIG. 1; 364/DIG. 2; 364/255.1; 364/254.9; 364/243; 364/948.1; 364/958.5; 364/970.3

[58] **Field of Search** 395/500, 800

[56] **References Cited**

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4,604,695	8/1986	Widen et al.	395/400
4,679,140	7/1987	Gotou et al.	395/775
4,852,048	7/1989	Morton	395/800
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5,023,777	6/1991	Sawamoto	395/400
5,129,070	7/1992	Dorotte	395/400

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United States Patent [19]

Powell et al.

[11] Patent Number: 5,430,864

[45] Date of Patent: Jul. 4, 1995

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Primary Examiner—Parshotam S. Lall
Assistant Examiner—Timothy L. Philipp
Attorney, Agent, or Firm—Blakely, Sokoloff, Taylor & Zafman

[57] **ABSTRACT**

The present invention enables a computer system to store from register files to memory, and restore from memory back to the register files, data from programs designed to operate in accordance with a first word size, as well as programs designed to operate in accordance with a second word size. This is accomplished without an increase in hardware and without requiring modification of existing software. In particular, an indication is utilized at the procedure level to designate whether a particular procedure is using words of a first or second word size. Preferably, this indication is placed in a first predetermined bit position in the stack pointer of the procedure. When a save occurs, certain contents from the register file are saved to memory along with the stack pointer. Under certain circumstances, the word size indication is moved to a second predetermined bit position within the stack pointer which is stored in a predesignated stack pointer address in the save area. When the contents are restored from memory, back to the register file, the indication is reviewed in the stack pointer address and serves to determine the word size of the procedure being restored.

16 Claims, 3 Drawing Sheets